

EXHIBIT B

IN THE COURT OF CHANCERY OF THE STATE OF DELAWARE
IN AND FOR NEW CASTLE COUNTY

ELSMERE PARK CLUB, L.P.
d/b/a FENWICK APARTMENTS,

Plaintiff,

v.

TOWN OF ELSMERE,

Defendants.

Civil Action No. 19970-NC

AFFIDAVIT OF GERALD LLEWELLYN, Ph.D.

STATE OF DELAWARE)
: ss.
_____ COUNTY)

I, Gerald Llewellyn, declare as follows:

1. I am Gerald Llewellyn, Ph.D., and I am the Toxicologist with the Division of Public Health of the State of Delaware and am familiar with the facts set forth herein.

2. Based upon the reports delivered to me by my colleagues in the Division of Public Health of the State of Delaware and my own inspection of some of the buildings and their basements at Fenwick Park Apartments, I have advised the Town of Elsmere that there is a serious health hazard to the occupants of those buildings and that it is appropriate that those occupants vacate those buildings before remediation takes place, especially sensitive populations (infants, immune compromised, respiratory conditions, recently released hospital patients and the elderly).

3. I have reviewed the Affidavit of Matthew Banka filed in this matter. I do not agree with much of Mr. Banka's opinions. Specifically, I do not agree:

- a) that the mold was small or in an isolated part of the basements (instead, the mold is much more extensive);
- b) that the mold will not be present in the individual apartments (instead the

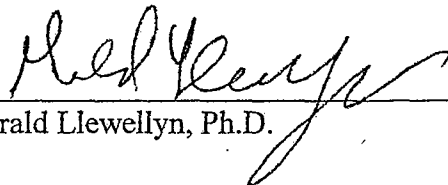
mold spores probably have migrated to the apartments;

- c) that the mold may be removed without presenting an increased health threat to the apartment occupants (instead, the mold is so extensive that its removal will present an increased hazard).

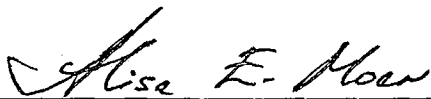
4. The construction of the Fenwick Park Apartments is conducive to the spread of mold spores from the basements. The buildings have only one entrance and air circulation flows from the basement up the stairs and ^{also} through the opening from the pipe ^{, and wire chases,} and air ducts that run from the basements to the apartments. As a result, the mold spores ^{are free to} have traveled from the basements to the apartments already and will continue to do so until the mold and other contaminants are removed. Thus, sealing off the basements, even if possible, will not cure the contamination problem. *Contamination and exposure have already occurred.*

5. I have attended several public meetings with residents of these apartments and advised them of my concerns over the potential mold and other contaminants ^{adjacent to and likely} in their apartments.

6. The illness that may result from the current mold levels that I believe are now in the apartments range from possible fatal ^{developments} infections for new infants to less severe, but still serious illnesses, *and worsening health for the sensitive populations.*


Gerald Llewellyn, Ph.D.

SWORN TO AND SUBSCRIBED before me this 10th day of October, 2002.


Notary Public

Pursuant to 29 Del. C. § 4323(a)

IN THE COURT OF CHANCERY OF THE STATE OF DELAWARE
IN AND FOR NEW CASTLE COUNTY

ELSMERE PARK CLUB, L.P.
d/b/a FENWICK APARTMENTS,

Plaintiff,

v.

TOWN OF ELSMERE,

Defendants.

Civil Action No. 19970-NC

AFFIDAVIT OF KENNETH M. BELMONT

STATE OF DELAWARE)

: ss.

NEW CASTLE COUNTY)

I, Kenneth M. Belmont, declare as follows:


1. I am an Industrial Hygienist for the State of Delaware, Division of Public Health.
2. I have 10 years field experience as an industrial hygienist on asbestos lead, microbiological investigation and Project Design, implementation, sampling and monitoring. I have completed various course work and have 10.5 years military service as nuclear, biological, chemical specialist, background with ^{biological} bio-work, decontamination and ~~ASA~~ ^{as a command advisor.}
3. On October 4 and the following week, I conducted an inspection of indoor/basements at Fenwick Park Apartments due to odor complaint. I visually assessed, and used olfactory determination of odors and did a visual confirmation for same. I advised the State Toxicologist, Gerald C. Llewellyn, Ph.D., of the conditions, offered assistance to Town of Elsmere for continued support to determine extent of problem on October 8, 2002. ^{Later,} I also secured 3 bulk and 1 swab sample to determine genre of typical growth observed.

4. I observed moist/wet conditions, temperatures appropriate for mold growth, and air pathways throughout the buildings, all of which were optimal in this respect.

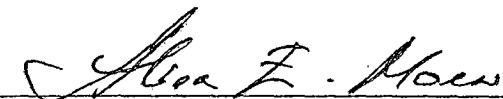
5. I am aware that these apartments last flooded in 1989, and were closed/sealed off without repairing water damage. This condition can be compared to an incubator. Open pathway(s) at wall cavities, pipe/service chases and open ceilings allow migration of spores, humidity and air currents allowing introduction to adequate nutrient sources.

6. The NYC Guidelines ^{as a minimum} that we apply in mold investigations, have been adopted by the State of Delaware and are attached hereto as Exhibit "A".

7. Disturbance of mold in an uncontrolled manner will cause migration, mold generation and cross contamination throughout the facility. Removal of damaged structural, load bearing and fire rated assemblies will not only degrade structural integrity of the building and affect the Privacy/Security of rented space, but will increase the pathways of exposure to tenants. Other issues may include asbestos exposure, sewage and insects/pests (rodents). There is a likelihood that unseen conditions exist in 2nd/3rd floor apartment wall cavities. Therefore, these spaces also need to be evaluated by a professional service ^{firm} ~~form~~ as part of the Remediation Plan.


Kenneth M. Belmont

SWORN TO AND SUBSCRIBED before me this 10th day of October, 2002.


Notary Public
Pursuant to 29 Del. C. § 4323(a)(3)



New York City Department of Health
Bureau of Environmental Investigations

Facts About Mold

The New York City Health Department has developed this fact sheet to address some of the most common questions and concerns regarding mold.

What is mold and where is it found?

Molds (fungi) are present EVERYWHERE -indoors and outdoors. They serve an important, positive role, by helping to break down organic matter. There are more than 100,000 species of mold. At least 1,000 species of molds are common in the U.S.

Some of the most common molds found are species of *Cladosporium*, *Penicillium*, and *Aspergillus*. Mold is most likely to grow where there is water or dampness — such as in bathrooms and basements.

How can molds affect your health?

The most common types of mold are generally not hazardous to healthy individuals. However, people who have asthma, hayfever, or other allergies or have weakened immune systems are more likely to react to mold. The most common symptoms are running nose, eye irritation, cough, congestion, and aggravation of asthma. A small percentage of the population can develop more serious effects — such as fevers and breathing difficulties — but these effects are uncommon. Some types of mold can cause more serious health problems, but this is much more rare.

How can you be exposed to mold?

When moldy material becomes damaged or disturbed, spores (reproductive bodies similar to seeds) can be released into the air. Exposure can occur if people inhale the spores or directly handle mold-containing material and accidentally ingest it. Some molds can produce chemicals called mycotoxins. Mycotoxins may cause illness in persons who are sensitive to them (for example, persons who are prone to allergies) or when persons are exposed to large amounts in the air (typically associated with certain occupations).

What is *Stachybotrys Chartarum*?

Stachybotrys chartarum (SC) (also known as *Stachybotrys atra*) is one mold that is associated with health effects in people. SC is a greenish-black mold that can grow on materials with a high cellulose content (such as drywall sheetrock, dropped ceiling tiles, and wood) that become chronically moist or water-damaged, due to excessive humidity, water leaks, condensation, or flooding. SC is a relatively uncommon mold. SC spores do not become easily airborne; therefore, contamination of indoor air by SC is unusual.

How can you tell if SC is present in your home?

All mold needs water to grow. Mold can grow anywhere there is water damage, high humidity or dampness. Most often molds are confined to areas near the source of water. Removing the source of moisture, such as through repairs or dehumidification, is critical to preventing mold growth. Many molds are black in appearance but are not SC, for example, the black mold commonly found between bathroom tiles. SC can only be positively identified through microscopic exam or by specially trained professionals.

How can SC affect your health?

Typically, indoor air levels of SC are low, and therefore not generally hazardous to health. However, as with other molds, at higher levels health effects can occur. These include allergic rhinitis (cold like symptoms), dermatitis (rashes), sinusitis, conjunctivitis, and aggravation of asthma. Some related

symptoms are more general, such as inability to concentrate and fatigue. Usually symptoms disappear after the contamination is removed.

There has been some evidence linking SC with pulmonary hemosiderosis, a condition that causes bleeding in the lungs of infants generally less than six months old. This is a very rare condition. In cases of hemosiderosis, the exposure to SC came from highly contaminated dwellings, where the infants were continually exposed over a long period of time.

What should you do if mold is present in your home or apartment?

Although any visible mold can be tested by an environmental consultant and/or analyzed by a laboratory specializing in microbiology, these tests can be very expensive -- from hundreds to thousands of dollars. There is no simple and cheap way to sample the air in your home to find out what types of mold are present and if they are airborne. As noted above, even if you had your home tested, it is difficult to say at what levels molds would cause health effects. Therefore, it is more important get rid of the mold rather than find out more about it. The most effective way to treat mold is to correct underlying water damage and clean the affected area.

How should mold be cleaned?

Mold should be cleaned as soon as it appears. Persons cleaning mold should be free of symptoms and allergies. Use a common household bleach and water mix (1 part bleach to 10 parts water) to clean it. You can add a little dish soap to the bleach and water mix to cut any dirt and oil on the wall that can hold mold. Do not add ammonia. This can result in dangerous vapors. Apply the bleach and water mix to the surface with a sponge, let it sit for 15 minutes, then thoroughly dry the surface. Dispose of any sponges or rags used to clean mold.

If the mold returns quickly or spreads, it may indicate an underlying problem such as a leak. Any underlying water problems must be fixed to successfully eliminate mold problems. If mold contamination is extensive, a professional abatement company may need to be consulted.

Will my health or my child's health be affected and should we see a physician?

If you believe that you or your children have symptoms that you suspect are caused by exposure to mold, you should see a physician. Keep in mind that many symptoms associated with mold exposure may also be caused by many other illnesses. You should tell your physician about the symptoms and about when, how, and for how long you think you or your children were exposed.

Who can I call if I suspect I have a mold problem or if I want more information?

For more information about the health effects of mold exposure and information on the safe removal of mold, please call the New York City Department of Health, Bureau of Environmental Investigations at (212) 442-3372 or the Bureau of Environmental and Occupational Disease Prevention at (212) 788-4290.

May 1998

For more information on Mold, call 212-442-3372

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New York City Department of Health
Bureau of Environmental & Occupational Disease Epidemiology

Guidelines on Assessment and Remediation of Fungi in Indoor Environments

- Executive Summary
- Introduction
- Health Issues
- Environmental Assessment
- Remediation
- Hazard Communication
- Conclusion
- Notes and References
- Acknowledgments

Executive Summary

On May 7, 1993, the New York City Department of Health (DOH), the New York City Human Resources Administration (HRA), and the Mt. Sinai Occupational Health Clinic convened an expert panel on *Stachybotrys atra* in Indoor Environments. The purpose of the panel was to develop policies for medical and environmental evaluation and intervention to address *Stachybotrys atra* (now known as *Stachybotrys chartarum* (SC)) contamination. The original guidelines were developed because of mold growth problems in several New York City buildings in the early 1990's. This document revises and expands the original guidelines to include all fungi (mold). It is based both on a review of the literature regarding fungi and on comments obtained by a review panel consisting of experts in the fields of microbiology and health sciences. It is intended for use by building engineers and management, but is available for general distribution to anyone concerned about fungal contamination, such as environmental consultants, health professionals, or the general public.

We are expanding the guidelines to be inclusive of all fungi for several reasons:

- Many fungi (e.g., species of *Aspergillus*, *Penicillium*, *Fusarium*, *Trichoderma*, and *Memnoniella*) in addition to SC can produce potent mycotoxins, some of which are identical to compounds produced by SC. Mycotoxins are fungal metabolites that have been identified as toxic agents. For this reason, SC cannot be treated as uniquely toxic in indoor environments.
- People performing renovations/cleaning of widespread fungal contamination may be at risk for developing Organic Dust Toxic Syndrome (ODTS) or Hypersensitivity Pneumonitis (HP). ODTS may occur after a *single heavy* exposure to dust contaminated with fungi and produces flu-like symptoms. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. A variety of biological agents may cause ODTS including common species of fungi. HP may occur after repeated exposures to an allergen and can result in permanent lung damage.

- Fungi can cause allergic reactions. The most common symptoms are runny nose, eye irritation, cough, congestion, and aggravation of asthma.

Fungi are present almost everywhere in indoor and outdoor environments. The most common symptoms of fungal exposure are runny nose, eye irritation, cough, congestion, and aggravation of asthma. Although there is evidence documenting severe health effects of fungi in humans, most of this evidence is derived from ingestion of contaminated foods (i.e., grain and peanut products) or occupational exposures in agricultural settings where inhalation exposures were very high. With the possible exception of remediation to very heavily contaminated indoor environments, such high-level exposures are not expected to occur while performing remedial work.

There have been reports linking health effects in office workers to offices contaminated with moldy surfaces and in residents of homes contaminated with fungal growth. Symptoms, such as fatigue, respiratory ailments, and eye irritation were typically observed in these cases. Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, fungal contaminants and other bioaerosols, and water-damaged homes), and currently its association with SC is unproven.

The focus of this guidance document addresses mold contamination of building components (walls, ventilation systems, support beams, etc.) that are chronically moist or water damaged. Occupants should address common household sources of mold, such as mold found in bathroom tubs or between tiles with household cleaners. Moldy food (e.g., breads, fruits, etc.) should be discarded.

Building materials supporting fungal growth must be remediated *as rapidly as possible* in order to ensure a healthy environment. Repair of the defects that led to water accumulation (or elevated humidity) should be conducted in conjunction with or prior to fungal remediation. Specific methods of assessing and remediating fungal contamination should be based on the extent of visible contamination and underlying damage. The simplest and most expedient remediation that is reasonable, and properly and safely removes fungal contamination, should be used. Remediation and assessment methods are described in this document.

The use of respiratory protection, gloves, and eye protection is recommended. Extensive contamination, particularly if heating, ventilating, air conditioning (HVAC) systems or large occupied spaces are involved, should be assessed by an experienced health and safety professional and remediated by personnel with training and experience handling environmentally contaminated materials. Lesser areas of contamination can usually be assessed and remediated by building maintenance personnel. In order to prevent contamination from recurring, underlying defects causing moisture buildup and water damage must be addressed. Effective communication with building occupants is an essential component of all remedial efforts.

Fungi in buildings may cause or exacerbate symptoms of allergies (such as wheezing, chest tightness, shortness of breath, nasal congestion, and eye irritation), especially in persons who have a history of allergic diseases (such as asthma and rhinitis). Individuals with persistent health problems that appear to be related to fungi or other bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Decisions about removing individuals from an affected area must be based on the results of such medical evaluation, and be made on a case-by-case basis. Except in cases of widespread fungal contamination that are linked to illnesses throughout a building, building-wide evacuation is not indicated.

In summary, prompt remediation of contaminated material and infrastructure repair is the primary response to

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ungal contamination in buildings. Emphasis should be placed on preventing contamination through proper building and HVAC system maintenance and prompt repair of water damage.

This document is not a legal mandate and should be used as a guideline. Currently there are no United States Federal, New York State, or New York City regulations for evaluating potential health effects of fungal contamination and remediation. These guidelines are subject to change as more information regarding fungal contaminants becomes available.

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Introduction

On May 7, 1993, the New York City Department of Health (DOH), the New York City Human Resources Administration (HRA), and the Mt. Sinai Occupational Health Clinic convened an expert panel on *Stachybotrys atra* in Indoor Environments. The purpose of the panel was to develop policies for medical and environmental evaluation and intervention to address *Stachybotrys atra* (now known as *Stachybotrys chartarum* (SC)) contamination. The original guidelines were developed because of mold growth problems in several New York City buildings in the early 1990's. This document revises and expands the original guidelines to include all fungi (mold). It is based both on a review of the literature regarding fungi and on comments obtained by a review panel consisting of experts in the fields of microbiology and health sciences. It is intended for use by building engineers and management, but is available for general distribution to anyone concerned about fungal contamination, such as environmental consultants, health professionals, or the general public.

This document contains a discussion of potential health effects; medical evaluations; environmental assessments; protocols for remediation; and a discussion of risk communication strategy. The guidelines are divided into four sections:

1. Health Issues; 2. Environmental Assessment; 3. Remediation; and 4. Hazard Communication.

We are expanding the guidelines to be inclusive of all fungi for several reasons:

- Many fungi (e.g., species of *Aspergillus*, *Penicillium*, *Fusarium*, *Trichoderma*, and *Memnoniella*) in addition to SC can produce potent mycotoxins, some of which are identical to compounds produced by SC.^{1,2,3,4} Mycotoxins are fungal metabolites that have been identified as toxic agents. For this reason, SC cannot be treated as uniquely toxic in indoor environments.
- People performing renovations/cleaning of widespread fungal contamination may be at risk for developing Organic Dust Toxic Syndrome (ODTS) or Hypersensitivity Pneumonitis (HP). ODTS may occur after a *single heavy* exposure to dust contaminated with fungi and produces flu-like symptoms. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. A variety of biological agents may cause ODTS including common species of fungi. HP may occur after repeated exposures to an allergen and can result in permanent lung damage.^{5,6,7,8,9,10}
- Fungi can cause allergic reactions. The most common symptoms are runny nose, eye irritation, cough, congestion, and aggravation of asthma.^{11,12}

Fungi are present almost everywhere in indoor and outdoor environments. The most common symptoms of fungal exposure are runny nose, eye irritation, cough, congestion, and aggravation of asthma. Although there is

evidence documenting severe health effects of fungi in humans, most of this evidence is derived from ingestion of contaminated foods (i.e., grain and peanut products) or occupational exposures in agricultural settings where inhalation exposures were very high.^{13, 14} With the possible exception of remediation to very heavily contaminated indoor environments, such high level exposures are not expected to occur while performing remedial work.¹⁵

There have been reports linking health effects in office workers to offices contaminated with moldy surfaces and in residents of homes contaminated with fungal growth.^{12, 16, 17, 18, 19, 20} Symptoms, such as fatigue, respiratory ailments, and eye irritation were typically observed in these cases.

Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, other microbial contaminants, and water-damaged homes), and currently its association with SC is unproven.^{21, 22, 23}

The focus of this guidance document addresses mold contamination of building components (walls, ventilation systems, support beams, etc.) that are chronically moist or water damaged. Occupants should address common household sources of mold, such as mold found in bathroom tubs or between tiles with household cleaners. Moldy food (e.g., breads, fruits, etc.) should be discarded.

This document is not a legal mandate and should be used as a guideline. Currently there are no United States Federal, New York State, or New York City regulations for evaluating potential health effects of fungal contamination and remediation. These guidelines are subject to change as more information regarding fungal contaminants becomes available.

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1. Health Issues

1.1 Health Effects

Inhalation of fungal spores, fragments (parts), or metabolites (e.g., mycotoxins and volatile organic compounds) from a wide variety of fungi may lead to or exacerbate immunologic (allergic) reactions, cause toxic effects, or cause infections.^{11, 12, 24}

There are only a limited number of documented cases of health problems from indoor exposure to fungi. The intensity of exposure and health effects seen in studies of fungal exposure in the indoor environment was typically much less severe than those that were experienced by agricultural workers but were of a long-term duration.^{5-10, 12, 14, 16-20, 25-27} Illnesses can result from both high level, short-term exposures and lower level, long-term exposures. The most common symptoms reported from exposures in indoor environments are runny nose, eye irritation, cough, congestion, aggravation of asthma, headache, and fatigue.^{11, 12, 16-20}

The presence of fungi on building materials as identified by a visual assessment or by bulk/surface sampling results does not necessitate that people will be exposed or exhibit health effects. In order for humans to be exposed indoors, fungal spores, fragments, or metabolites must be released into the air and inhaled, physically contacted (dermal exposure), or ingested. Whether or not symptoms develop in people

exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the amount of exposure, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, state of health, and concurrent exposures. For these reasons, and because measurements of exposure are not standardized and biological markers of exposure to fungi are largely unknown, it is not possible to determine "safe" or "unsafe" levels of exposure for people in general.

1.1.1 Immunological Effects

Immunological reactions include asthma, HP, and allergic rhinitis. Contact with fungi may also lead to dermatitis. It is thought that these conditions are caused by an immune response to fungal agents. The most common symptoms associated with allergic reactions are runny nose, eye irritation, cough, congestion, and aggravation of asthma.^{11, 12} HP may occur after repeated exposures to an allergen and can result in permanent lung damage. HP has typically been associated with repeated heavy exposures in agricultural settings but has also been reported in office settings.^{25, 26, 27} Exposure to fungi through renovation work may also lead to initiation or exacerbation of allergic or respiratory symptoms.

1.1.2 Toxic Effects

A wide variety of symptoms have been attributed to the toxic effects of fungi. Symptoms, such as fatigue, nausea, and headaches, and respiratory and eye irritation have been reported. Some of the symptoms related to fungal exposure are non-specific, such as discomfort, inability to concentrate, and fatigue.^{11, 12, 16-20} Severe illnesses such as ODDS and pulmonary hemosiderosis have also been attributed to fungal exposures.^{5-10, 21, 22}

ODDS describes the abrupt onset of fever, flu-like symptoms, and respiratory symptoms in the hours following a *single, heavy* exposure to dust containing organic material including fungi. It differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. ODDS may be caused by a variety of biological agents including common species of fungi (e.g., species of *Aspergillus* and *Penicillium*). ODDS has been documented in farm workers handling contaminated material but is also of concern to workers performing renovation work on building materials contaminated with fungi.⁵⁻¹⁰

Some studies have suggested an association between SC and pulmonary hemorrhage/hemosiderosis in infants, generally those less than six months old. Pulmonary hemosiderosis is an uncommon condition that results from bleeding in the lungs. The cause of this condition is unknown, but may result from a combination of environmental contaminants and conditions (e.g., smoking, fungal contaminants and other bioaerosols, and water-damaged homes), and currently its association with SC is unproven.^{21, 22, 23}

1.1.3 Infectious Disease

Only a small group of fungi have been associated with infectious disease. Aspergillosis is an infectious disease that can occur in immunosuppressed persons. Health effects in this population can be severe. Several species of *Aspergillus* are known to cause aspergillosis. The most common is *Aspergillus fumigatus*. Exposure to this common mold, even to high concentrations, is unlikely to cause infection in a healthy person.^{11, 24}

Exposure to fungi associated with bird and bat droppings (e.g., *Histoplasma capsulatum* and *Cryptococcus neoformans*) can lead to health effects, usually transient flu-like illnesses, in healthy individuals. Severe health effects are primarily encountered in immunocompromised persons.^{24, 28, 29}

1.2 Medical Evaluation

Individuals with persistent health problems that appear to be related to fungi or other bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Infants (less than 12 months old) who are experiencing non-traumatic nosebleeds or are residing in dwellings with damp or moldy conditions and are experiencing breathing difficulties should receive a medical evaluation to screen for alveolar hemorrhage. Following this evaluation, infants who are suspected of having alveolar hemorrhaging should be referred to a pediatric pulmonologist. Infants diagnosed with pulmonary hemosiderosis and/or pulmonary hemorrhaging should not be returned to dwellings until remediation and air testing are completed.

Clinical tests that can determine the source, place, or time of exposure to fungi or their products are not currently available. Antibodies developed by exposed persons to fungal agents can only document that exposure has occurred. Since exposure to fungi routinely occurs in both outdoor and indoor environments this information is of limited value.

1.3 Medical Relocation

Infants (less than 12 months old), persons recovering from recent surgery, or people with immune suppression, asthma, hypersensitivity pneumonitis, severe allergies, sinusitis, or other chronic inflammatory lung diseases may be at greater risk for developing health problems associated with certain fungi. Such persons should be removed from the affected area during remediation (see Section 3, Remediation). Persons diagnosed with fungal related diseases should not be returned to the affected areas until remediation and air testing are completed.

Except in cases of widespread fungal contamination that are linked to illnesses throughout a building, a building-wide evacuation is not indicated. A trained occupational/environmental health practitioner should base decisions about medical removals in the occupational setting on the results of a clinical assessment.

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2. Environmental Assessment

The presence of mold, water damage, or musty odors should be addressed immediately. In all instances, any source(s) of water must be stopped and the extent of water damaged determined. Water damaged materials should be dried and repaired. Mold damaged materials should be remediated in accordance with this document (see Section 3, Remediation).

2.1 Visual Inspection

A visual inspection is the most important initial step in identifying a possible contamination problem. The extent of any water damage and mold growth should be visually assessed. This assessment is important in determining remedial strategies. Ventilation systems should also be visually checked, particularly for damp filters but also for damp conditions elsewhere in the system and overall cleanliness. Ceiling tiles, gypsum wallboard (sheetrock), cardboard, paper, and other cellulosic surfaces should be given careful attention during a visual inspection. The use of equipment such as a boroscope, to view spaces in ductwork or behind walls, or a moisture meter, to detect moisture in building materials, may be helpful in

identifying hidden sources of fungal growth and the extent of water damage.

2.2 Bulk/Surface Sampling

- a. Bulk or surface sampling is not required to undertake a remediation. Remediation (as described in Section 3, Remediation) of visually identified fungal contamination should proceed without further evaluation.
- b. Bulk or surface samples may need to be collected to identify specific fungal contaminants as part of a medical evaluation if occupants are experiencing symptoms which may be related to fungal exposure or to identify the presence or absence of mold if a visual inspection is equivocal (e.g., discoloration, and staining).
- c. An individual trained in appropriate sampling methodology should perform bulk or surface sampling. Bulk samples are usually collected from visibly moldy surfaces by scraping or cutting materials with a clean tool into a clean plastic bag. Surface samples are usually collected by wiping a measured area with a sterile swab or by stripping the suspect surface with clear tape. Surface sampling is less destructive than bulk sampling. Other sampling methods may also be available. A laboratory specializing in mycology should be consulted for specific sampling and delivery instructions.

2.3 Air Monitoring

- a. Air sampling for fungi should not be part of a routine assessment. This is because decisions about appropriate remediation strategies can usually be made on the basis of a visual inspection. In addition, air-sampling methods for some fungi are prone to false negative results and therefore cannot be used to definitively rule out contamination.
- b. Air monitoring may be necessary if an individual(s) has been diagnosed with a disease that is or may be associated with a fungal exposure (e.g., pulmonary hemorrhage/hemosiderosis, and aspergillosis).
- c. Air monitoring may be necessary if there is evidence from a visual inspection or bulk sampling that ventilation systems may be contaminated. The purpose of such air monitoring is to assess the extent of contamination throughout a building. It is preferable to conduct sampling while ventilation systems are operating.
- d. Air monitoring may be necessary if the presence of mold is suspected (e.g., musty odors) but cannot be identified by a visual inspection or bulk sampling (e.g., mold growth behind walls). The purpose of such air monitoring is to determine the location and/or extent of contamination.
- e. If air monitoring is performed, for comparative purposes, outdoor air samples should be collected concurrently at an air intake, if possible, and at a location representative of outdoor air. For additional information on air sampling, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."
- f. Personnel conducting the sampling must be trained in proper air sampling methods for microbial contaminants. A laboratory specializing in mycology should be consulted for specific sampling and shipping instructions.

2.4 Analysis of Environmental Samples

Microscopic identification of the spores/colonies requires considerable expertise. These services are not routinely available from commercial laboratories. Documented quality control in the laboratories used for analysis of the bulk/surface and air samples is necessary. The American Industrial Hygiene Association (AIHA) offers accreditation to microbial laboratories (Environmental Microbiology Laboratory Accreditation Program (EMLAP)). Accredited laboratories must participate in quarterly proficiency testing (Environmental Microbiology Proficiency Analytical Testing Program (EMPAT)).

Evaluation of bulk/surface and air sampling data should be performed by an experienced health professional. The presence of few or trace amounts of fungal spores in bulk/surface sampling should be considered background. Amounts greater than this or the presence of fungal fragments (e.g., hyphae, and conidiophores) may suggest fungal colonization, growth, and/or accumulation at or near the sampled location.³⁰ Air samples should be evaluated by means of comparison (i.e., indoors to outdoors) and by fungal type (e.g., genera, and species). In general, the levels and types of fungi found should be similar indoors (in non-problem buildings) as compared to the outdoor air. Differences in the levels or types of fungi found in air samples may indicate that moisture sources and resultant fungal growth may be problematic.

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3. Remediation

In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Any initial water infiltration should be stopped and cleaned immediately. An immediate response (within 24 to 48 hours) and thorough clean up, drying, and/or removal of water damaged materials will prevent or limit mold growth. If the source of water is elevated humidity, relative humidity should be maintained at levels below 60% to inhibit mold growth.³¹ Emphasis should be on ensuring proper repairs of the building infrastructure, so that water damage and moisture buildup does not recur.

Five different levels of abatement are described below. The size of the area impacted by fungal contamination primarily determines the type of remediation. The sizing levels below are based on professional judgement and practicality; currently there is not adequate data to relate the extent of contamination to frequency or severity of health effects. **The goal of remediation is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area, while protecting the health of workers performing the abatement.** The listed remediation methods were designed to achieve this goal, however, due to the general nature of these methods it is the responsibility of the people conducting remediation to ensure the methods enacted are adequate. The listed remediation methods are not meant to exclude other similarly effective methods. Any changes to the remediation methods listed in these guidelines, however, should be carefully considered prior to implementation.

Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly moldy can be cleaned and reused. Cleaning should be done using a detergent solution. Porous materials such as ceiling tiles and insulation, and wallboards with more than a small area of contamination should be removed and discarded. Porous materials (e.g., wallboard, and fabrics) that can be cleaned, can be reused, but should be discarded if possible. A professional restoration consultant should be contacted when restoring porous materials with more than a small area of fungal contamination. All materials to be reused should be dry and visibly free from mold. Routine inspections should be conducted to confirm the effectiveness of remediation work.

The use of gaseous, vapor-phase, or aerosolized biocides for remedial purposes is not recommended. The use of

biocides in this manner can pose health concerns for people in occupied spaces of the building and for people returning to the treated space if used improperly. Furthermore, the effectiveness of these treatments is unproven and does not address the possible health concerns from the presence of the remaining non-viable mold. For additional information on the use of biocides for remedial purposes, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control."

3.1 Level I: Small Isolated Areas (10 sq. ft or less) - e.g., ceiling tiles, small areas on walls

- a. Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- b. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- c. The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons recovering from recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- d. Containment of the work area is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
- e. Contaminated materials that cannot be cleaned should be removed from the building in a sealed plastic bag. There are no special requirements for the disposal of moldy materials.
- f. The work area and areas used by remedial workers for egress should be cleaned with a damp cloth and/or mop and a detergent solution.
- g. All areas should be left dry and visibly free from contamination and debris.

3.2 Level II: Mid-Sized Isolated Areas (10 - 30 sq. ft.) - e.g., individual wallboard panels.

- a. Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- b. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- c. The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- d. The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.

- e. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
- f. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials.
- g. The work area and areas used by remedial workers for egress should be HEPA vacuumed (a vacuum equipped with a High-Efficiency Particulate Air filter) and cleaned with a damp cloth and/or mop and a detergent solution.
- h. All areas should be left dry and visibly free from contamination and debris.

3.3 Level III: Large Isolated Areas (30 - 100 square feet) - e.g., several wallboard panels.

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project.

The following procedures *at a minimum* are recommended:

- a. Personnel trained in the handling of hazardous materials and equipped with respiratory protection, (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- b. The work area and areas directly adjacent should be covered with a plastic sheet(s) and taped before remediation, to contain dust/debris.
- c. Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.
- d. The work area and areas directly adjacent should be unoccupied. Further vacating of people from spaces near the work area is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- e. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
- f. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials.
- g. The work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.
- h. All areas should be left dry and visibly free from contamination and debris.

If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the fungi is heavy (blanket coverage as opposed to patchy), then it is recommended that the remediation procedures for Level IV are followed.

3.4 Level IV: Extensive Contamination (greater than 100 contiguous square feet in an area)

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project. The following procedures are recommended:

- a. Personnel trained in the handling of hazardous materials equipped with:
 - i. Full-face respirators with high efficiency particulate air (HEPA) cartridges
 - ii. Disposable protective clothing covering both head and shoes
 - iii. Gloves
- b. Containment of the affected area:
 - i. Complete isolation of work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and any other openings)
 - ii. The use of an exhaust fan with a HEPA filter to generate negative pressurization
 - iii. Airlocks and decontamination room
- c. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons having undergone recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- d. Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of moldy materials.
- e. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop with a detergent solution and be visibly clean prior to the removal of isolation barriers.
- f. Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy.

3.5 Level V: Remediation of HVAC Systems

3.5.1 A Small Isolated Area of Contamination (<10 square feet) in the HVAC System

- a. Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- b. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- c. The HVAC system should be shut down prior to any remedial activities.
- d. The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.

- e. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.
- f. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. There are no special requirements for the disposal of moldy materials.
- g. The work area and areas immediately surrounding the work area should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution.
- h. All areas should be left dry and visibly free from contamination and debris.
- i. A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.

3.5.2 Areas of Contamination (>10 square feet) in the HVAC System

A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for remediation projects involving more than a small isolated area in an HVAC system. The following procedures are recommended:

- a. Personnel trained in the handling of hazardous materials equipped with:
 - i. Respiratory protection (e.g., N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended.
 - ii. Gloves and eye protection
 - iii. Full-face respirators with HEPA cartridges and disposable protective clothing covering both head and shoes should be worn if contamination is greater than 30 square feet.
- b. The HVAC system should be shut down prior to any remedial activities.
- c. Containment of the affected area:
 - i. Complete isolation of work area from the other areas of the HVAC system using plastic sheeting sealed with duct tape.
 - ii. The use of an exhaust fan with a HEPA filter to generate negative pressurization.
 - iii. Airlocks and decontamination room if contamination is greater than 30 square feet.
- d. Growth supporting materials that are contaminated, such as the paper on the insulation of interior lined ducts and filters, should be removed. Other contaminated materials that cannot be cleaned should be removed in sealed plastic bags. When a decontamination chamber is present, the outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed prior to their transport to uncontaminated areas of the building. There are no special requirements for the disposal of moldy materials.
- e. The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth and/or mop and a detergent solution prior to the removal of isolation barriers.
- f. All areas should be left dry and visibly free from contamination and debris.

- g. Air monitoring should be conducted prior to re-occupancy with the HVAC system in operation to determine if the area(s) served by the system are fit to reoccupy.
- h. A variety of biocides are recommended by HVAC manufacturers for use with HVAC components, such as, cooling coils and condensation pans. HVAC manufacturers should be consulted for the products they recommend for use in their systems.

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4. Hazard Communication

When fungal growth requiring large-scale remediation is found, the building owner, management, and/or employer should notify occupants in the affected area(s) of its presence. Notification should include a description of the remedial measures to be taken and a timetable for completion. Group meetings held before or after remediation with full disclosure of plans and results can be an effective communication mechanism. Individuals with persistent health problems that appear to be related to bioaerosol exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures. Individuals seeking medical attention should be provided with a copy of all inspection results and interpretation to give to their medical practitioners.

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Conclusion

In summary, the prompt remediation of contaminated material and infrastructure repair must be the primary response to fungal contamination in buildings. The simplest and most expedient remediation that properly and safely removes fungal growth from buildings should be used. In all situations, the underlying cause of water accumulation must be rectified or the fungal growth will recur. Emphasis should be placed on preventing contamination through proper building maintenance and prompt repair of water damaged areas.

Widespread contamination poses much larger problems that must be addressed on a case-by-case basis in consultation with a health and safety specialist. Effective communication with building occupants is an essential component of all remedial efforts. Individuals with persistent health problems should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialties and are knowledgeable about these types of exposures.

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Notes and References

1. Bata A, Harrach B, Kalman U, Kis-tamas A, Laszity R. Macrocyclic Trichothecene Toxins Produced by *Stachybotrys atra* Strains Isolated in Middle Europe. *Applied and Environmental Microbiology* 1985; 49:678-81.
2. Jarvis B, "Mycotoxins and Indoor Air Quality," *Biological Contaminants in Indoor Environments*, ASTM STP 1071, Morey P, Feely Sr. J, Otten J, Editors, American Society for Testing and Materials, Philadelphia, 1990.
3. Yang C, Johanning E, "Airborne Fungi and Mycotoxins," *Manual of Environmental Microbiology*, Hurst C, Editor in Chief, ASM Press, Washington, D.C., 1996

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4. Jarvis B, Mazzola E. Macrocyclic and Other Novel Trichothecenes: Their Structure, Synthesis, and Biological Significance. *Acc. Chem. Res.* 1982; 15:388-95.
5. Von Essen S, Robbins R, Thompson A, Rennard S. Organic Dust Toxic Syndrome: An Acute Febrile Reaction to Organic Dust Exposure Distinct from Hypersensitivity Pneumonitis. *Clinical Toxicology* 1990; 28(4):389-420.
6. Richerson H. Unifying Concepts Underlying the Effects of Organic Dust Exposures. *American Journal of Industrial Medicine* 1990; 17:139-42.
7. Malmberg P, Rask-Andersen A, Lundholm M, Palmgren U. Can Spores from Molds and Actinomycetes Cause an Organic Dust Toxic Syndrome Reaction?. *American Journal of Industrial Medicine* 1990; 17:109-10.
8. Malmberg P. Health Effects of Organic Dust Exposure in Dairy Farmers. *American Journal of Industrial Medicine* 1990; 17:7-15.
9. Yoshida K, Masayuki A, Shukuro A. Acute Pulmonary Edema in a Storehouse of Moldy Oranges: A Severe Case of the Organic Dust Toxic Syndrome. *Archives of Environmental Health* 1989; 44(6): 382-84.
10. Lecours R, Laviolette M, Cormier Y. Bronchoalveolar Lavage in Pulmonary Mycotoxicosis. *Thorax* 1986; 41:924-6.
11. Levettin E. "Fungi," *Bioaerosols*, Burge H, Editor, CRC Press, Boca Raton, Florida, 1995.
12. Husman T. Health Effects of Indoor-air Microorganisms. *Scand J Work Environ Health* 1996; 22:5-13.
13. Miller J D. Fungi and Mycotoxins in Grain: Implications for Stored Product Research. *J Stored Prod Res* 1995; 31(1):1-16.
14. Cookingham C, Solomon W. "Bioaerosol-Induced Hypersensitivity Diseases," *Bioaerosols*, Burge H, Editor, CRC Press, Boca Raton, Florida, 1995.
15. Rautiala S, Reponen T, Nevalainen A, Husman T, Kalliokoski P. Control of Exposure to Airborne Viable Microorganisms During Remediation of Moldy Buildings; Report of Three Case Studies. *American Industrial Hygiene Association Journal* 1998; 59:455-60.
16. Dales R, Zwanenburg H, Burnett R, Franklin C. Respiratory Health Effects of Home Dampness and Molds among Canadian Children. *American Journal of Epidemiology* 1991; 134(2): 196-203.
17. Hodgson M, Morey P, Leung W, Morrow L, Miller J D, Jarvis B, Robbins H, Halsey J, Storey E. Building-Associated Pulmonary Disease from Exposure to *Stachybotrys chartarum* and *Aspergillus versicolor*. *Journal of Occupational and Environmental Medicine* 1998; 40(3):241-9.
18. Croft W, Jarvis B, Yatawara C. Airborne Outbreak of Trichothecene Toxicosis. *Atmospheric Environment* 1986; 20(3):549-52.
19. DeKoster J, Thorne P. Bioaerosol Concentrations in Noncomplaint, Complaint, and Intervention Homes in the Midwest. *American Industrial Hygiene Association Journal* 1995; 56:573-80.
20. Johanning E, Biagini R, Hull D, Morey P, Jarvis B, Landbergis P. Health and Immunological Study Following Exposure to Toxicogenic Fungi (*Stachybotrys chartarum*) in a Water-Damaged Office Environment. *Int Arch Occup Environ Health* 1996; 68:207-18.
21. Montana E, Etzel R, Allan T, Horgan T, Dearborn D. Environmental Risk Factor Associated with Pediatric Idiopathic Pulmonary Hemorrhage and Hemosiderosis in a Cleveland Community. *Pediatrics* 1997; 99(1)
22. Etzel R, Montana E, Sorenson W G, Kullman G, Allan T, Dearborn D. Acute Pulmonary Hemorrhage in Infants Associated with Exposure to *Stachybotrys atra* and Other Fungi. *Ach Pediatr Adolesc Med* 1998; 152:757-62.
23. CDC. Update: Pulmonary Hemorrhage/Hemosiderosis Among Infants —Cleveland, Ohio, 1993 - 1996. *MMWR* 2000; 49(9): 180-4.
24. Burge H, Otten J. "Fungi," *Bioaerosols Assessment and Control*, Macher J, Editor, American Conference of Industrial Hygienists, Cincinnati, Ohio, 1999.

25. do Pico G. Hazardous Exposure and Lung Disease Among Farm Workers. *Clinics in Chest Medicine* 1992; 13(2):311-28.
26. Hodgson M, Morey P, Attfield M, Sorenson W, Fink J, Rhodes W, Visvesvara G. Pulmonary Disease Associated with Cafeteria Flooding. *Archives of Environmental Health* 1985; 40(2):96-101.
27. Weltermann B, Hodgson M, Storey E, DeGraff, Jr. A, Bracker A, Groseclose S, Cole S, Cartter M, Phillips D. Hypersensitivity Pneumonitis: A Sentinel Event Investigation in a Wet Building. *American Journal of Industrial Medicine* 1998; 34:499-505.
28. Band J. "Histoplasmosis." *Occupational Respiratory Diseases*, Merchant J, Editor. U.S. Department of Health and Human Services, Washington D.C., 1986.
29. Bertolini R. "Histoplasmosis A Summary of the Occupational Health Concern," Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, 1988.
30. Yang C. P&K Microbiology Services, Inc. Microscopic Examination of Sticky Tape or Bulk Samples for the Evaluation and Identification of Fungi. Cherry Hill, New Jersey.
31. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. Thermal Environmental Conditions for Human Occupancy - ASHRAE Standard (ANSI/ASHRAE 55-1992). Atlanta, Georgia, 1992.

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Mr. Gregg Recer	The New York State Department of Health
Dr. Gerald Llewellyn	State of Delaware, Division of Public Health
Mr. Daniel Price	Interface Research Corporation
Ms. Sylvia Pryce	The NYC Citywide Office of Occupational Safety and Health
Mr. Armando Chamorro	Ambient Environmental

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Ms. Marie-Alix d'Halewyn Laboratoire de santé publique du Québec
Dr. Elissa A. Favata Environmental and Occupational Health Associates
Dr. Harriet Ammann Washington State Department of Health
Mr. Terry Allan Cuyahoga County Board of Health

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Christopher D'Andrea, M.S. of the Environmental and Occupational Disease Epidemiology Unit, was the editor of this document.

For further information regarding this document please contact the New York City Department of Health at (212) 788-4290 / 4288.

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IN THE COURT OF CHANCERY OF THE STATE OF DELAWARE
IN AND FOR NEW CASTLE COUNTY

ELSMERE PARK CLUB, L.P.
d/b/a FENWICK APARTMENTS,

Plaintiff,

v.

TOWN OF ELSMERE,

Defendants.

Civil Action No. 19970-NC

AFFIDAVIT OF GEORGE YOCHER, M.S.

STATE OF DELAWARE)
: ss.
COUNTY OF NEW CASTLE)

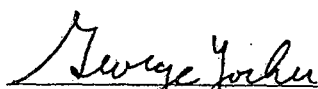
1. I am George Yocher, M.S., Environmental Epidemiologist, State of Delaware, Division of Public Health.

2. I have done 7 - 8 years indoor air quality investigations with training in IAQ and building dynamics (also hazardous waste site investigations).

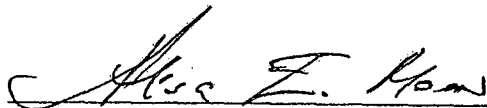
3. On October 7-8, 2002, I went through several basement units at Fenwick Park Apartments. I found extensive mold growth on walls, substructure wood; trash; sewage from toilet and tub over/back flow; broken, missing floor tiles (possible asbestos hazard); exposed electric wires, circuit boxes; slug pathways on brick; missing/collapsed section of sheet rock from walls and ceiling; dirt/mud/sludge from flooding; uncapped drain lines; leaking pipes; strong musty/mildew smell; rotten/missing wood studs, floor supports; broken sink and toilet fixtures.

4. Mold spreads via spores moving with air currents or with water. Some molds "shoot" spores out to nearby surfaces.

5. The design of apartments at Fenwick Park Apartments allows air movement through wall cavities, through pipe runs, electric runs, common vents for kitchen exhaust and the common hallway.
6. Mold causes various adverse health effects, including allergy (running nose, congestion, rashes, itchy eyes) symptoms; aggravates asthma; infections - lung, skin; infections in more susceptible people, such as those with AIDS, very young, transplant patients, those with suppressed/compromised immune systems.
7. To determine the condition/seriousness of mold, it is necessary to do a visual inspection to determine extent of mold coverage on open (surface) or hidden surfaces (square ft. coverage). Additional methods may include air sampling to determine amount of spores in air and do sampling/incubation to determine the type of mold.
8. Remediation/construction will cause mold spores to be disturbed and be carried by air currents. There are so many possible ways air can move from basement area (see # 5 above) so that it will be very difficult to isolate any apartment from the basement area.


George Yocher, M.S.

SWORN TO AND SUBSCRIBED before me, this 10th day of October, 2002.


Notary Public

Pursuant to 29 Del.C. §4323(a)(3)